# 4.7 MINING, INDUSTRY, AND ENERGY PRODUCTION

The primary industries in the Lahontan Region are mining and mineral processing. Other industries in the Region include lumber mills, energy production facilities, chemical manufacturing facilities, and concrete and asphalt batch plants.

Nearly all industrial operations have the potential to produce "general" types of water quality impacts, similar to those of any large construction site (e.g., erosion/sedimentation and spillage of motor vehicle fluids). Additionally, each type of industrial operation may pose its own industry-specific threats to water quality. For example, lumber mills can contribute significant quantities of tannins, lignins, BOD, and color to receiving waters. Concrete batch plants can contribute TDS, high alkalinity, and metals to receiving waters. Mining operations can contribute cyanide, heavy metals, or acid mine drainage to receiving waters.

## General Discharge Limitations

Waste discharge requirements are prescribed for each discharger on a case-by-case basis; however, in every case, industrial and municipal effluent discharged to waters of the Region shall contain essentially none of the following substances:

- Chlorinated hydrocarbons
- Toxic substances
- Harmful substances that may bioconcentrate or bioaccumulate
- Excessive heat
- Radioactive substances
- Grease, oil, and phenolic compounds
- Excessively acidic and basic substances
- Heavy metals such as lead, copper, zinc, mercury, etc.
- Other deleterious substances

Furthermore, any person who is discharging or proposes to discharge waste, other than into a community sewer system, must file a Report of Waste Discharge (RWD) with the Regional Board unless this requirement is waived by the Regional Board. Detailed lists of information needed in the RWD can be obtained from Regional Board staff. Upon receipt of the RWD, the Regional Board, with information and comments received from state agencies and the public, will prescribe discharge requirements including any appropriate limitations on biological and mineral constituents, as well as toxic or other deleterious substances. Additionally, revised waste discharge reports may be required prior to additions of waste, changes in treatment methods, changes in disposal area or increases in effluent flow.

Discharge requirements will be established that are consistent with the water quality objectives for the receiving water (see Chapter 3 of this Plan), including wasteload allocations or Total Maximum Daily Loads (TMDLs) established for the discharge, the State Board's "non-degradation" policy, the federal anti-degradation and anti-backsliding regulations, and the principle of obtaining the optimum beneficial use of the Basin's water resources.

## Mining and Mineral Processing Operations

Many quarries exist in the Lahontan Region, extracting such commodities as iron ore, pumice, marble, limestone, talc, and asbestos. Most such quarries do not use chemical extraction processes, and effects on water quality are usually limited to the general impacts described above.

Sand and gravel quarries are also fairly common in the Region, and are of concern because they often occur in riparian and/or floodplain areas. In general, discharges from sand and gravel operations comply with water quality objectives; such operations are usually considered to be minor, because potential adverse water quality impacts can most often be mitigated with relatively simple measures. The final restoration phase is the most critical—at the end of the project, the site must be stabilized, revegetated, and/or restored in a manner which will ensure long-term water quality protection.

An unknown number of recreation prospectors use "dry wash" or recirculating water systems to gravity separate gold. These activities have the potential to degrade water quality and beneficial uses by disturbing streambeds and riparian and floodplain areas.

The mining operations which pose the most significant threat to water quality in the Lahontan

Region are hard rock mining for precious metals (e.g., gold or silver). Toxic chemicals, such as cyanide or mercury, are often leached through ores to obtain precious metals. The chemical leaching process involves placement of crushed ore material onto a liner (heap leaching) or into a tank or vat (vat leaching), and saturation of the ore with the leaching chemical solution ("barren" solution). The solution leaches metals as it percolates through the ore, then drains to a pond ("pregnant" solution pond) where the metals can be recovered. Spent ores are washed with water to remove any remaining chemical solution prior to disposal.

Ore preparation generally involves some crushing or pulverizing. This process exposes a maximum amount of ore surface area for the chemical leaching process. This also maximizes the amount of surface area that will be exposed to the elements after the ore has been processed and disposed. Prolonged exposure to the elements (and/or to acid mine drainage) will result in the leaching of heavy metals and/or salts which the ore may contain.

Acid mine drainage (AMD) is the product of sulfurous rock, bacteria, water, and oxygen. This highly acidic drainage is associated with mining because, although it may occur naturally, mining activities tend to enhance the formation of AMD by opening tunnels (introducing water and/or oxygen to subterranean sulfurous rock) and by exposing large quantities of susceptible rock to the elements (waste tailings piles). Once AMD formation has been established, control is extremely difficult. The best control is prevention.

Water is utilized in mining operations for dust control, equipment cooling, make-up for leaching solutions, and for other purposes. In sand and gravel quarrying, water is used to wash aggregate. Process water may become contaminated with metals, salts, toxic chemicals, oils and greases, fuels, and/or sediments. If allowed to escape containment, process water is likely to impact or threaten to impact receiving waters. When a mining operation ceases, large water-filled ponds often remain on the site. These ponds may threaten receiving waters by concentrating on-site contaminants (becoming toxic pits), and by overflowing into surface waters.

## *Regulatory Authority*

Mining waste discharges are regulated under Article 7 of Chapter 15 (Cal. Code of Regs.). Further regulations for mines are contained in the California Water Code, Section 13260.

All mining operations are subject to the Surface Mining and Reclamation Act (SMARA, CA Public Resources Code, Title 14, Division 2, Chapter 9). SMARA requires that anyone proposing to conduct a mining operation file a reclamation plan with (and be permitted by) the Lead Agency (typically the County) in the area where the mine is to be sited. The reclamation plan must include, in part, a description of the type of operation to be conducted; the initiation and termination dates; and a description of the manner in which reclamation will be accomplished, including a description of the manner in which contaminants will be controlled and mining waste will be disposed of, and a description of the manner in which rehabilitation of affected streambed channels and streambanks to a condition of minimizing erosion and sedimentation will occur. The reclamation plan is a useful tool for the Regional Board in evaluating the level of regulation appropriate for a given operation. Whatever the level of regulation the Board decides upon, the operation will be regulated by the Lead Agency, and the operator will be required to reclaim the site at the end of the operation.

## *Federal Superfund Program*

The federal "Superfund" program was established in 1980 with the passage of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The CERCLA provided funding and guidelines for the cleanup of the most threatening hazardous waste sites in the nation. High priority sites scheduled for cleanup under this program are placed on the National Priority List (NPL). The federal government normally places large sites with identified problems on the Superfund list for cleanup. Ideally, the owner(s) or responsible parties are then required to conduct cleanup operations. However, if the owner(s) cannot be located or do not have sufficient funds, the cleanup becomes the responsibility of federal or state government. Smaller sites, or sites without identified problems may also pose significant threats to water quality, but do not make it onto the Superfund list. Once these sites are identified, they must be handled on a case-by-case basis by the Regional Board, ideally by responsible parties, but otherwise by State or local agencies.

## Active Mine Sites

***Case History—Mountain Pass Mine and Mill Operations***

The Mountain Pass Rare Earth Mine, first located in 1949, is in the Ivanpah district of the South Lahontan Basin. The district was mined intermittently until 1940, for silver, lead, zinc, and copper.

The Mountain Pass Mine and Mill is currently operated by Molycorp. The ore body consists of carbonates, sulfates, bastnaesite, and quartz. Bastnaesite is a rare earth fluorocarbonate which contains lanthanide (rare earth) metals. Lanthanide metals include cerium, lanthanum, samarium, gadolinium, neodymium, praseodymium, and europium, and are used in such things as lighter flints, ultraviolet absorbing glass, coloring agents for glass, and television tubes.

The Mountain Pass Mine and Mill is an open pit mine with milling, beneficiation, and processing facilities. The three major milling plants are the flotation plant, chemical plant, and separation plant. Mine wastewaters were discharged to percolation ponds onsite until 1980, causing degradation of underlying ground waters. Most mine wastewater is currently collected from various discharge points at the mill site and discharged to a 100-acre evaporation pond located on Ivanpah Dry Lake about 13 miles to the east. Mine waste overburden is stockpiled onsite. Process water, tailings, and product storage ponds still exist at the millsite.

Major water quality concerns at the Mountain Pass Mine include the continued leakage from the active main tailings pond. This leakage continues to degrade ground water already polluted by dissolved minerals, nitrates, and sodium lignin sulfonate, which is a surfactant used in the floatation plant. Other concerns included inactive waste disposal sites and lead sulfide precipitates stored at the Molycorp hazardous waste storage site. Molycorp is currently working under Regional Board and Department of Toxic Substances Control schedules to correct the problems.

## Abandoned/Historic Mines

In the past, mining operations were often conducted with little concern for immediate or future environmental impacts. Tailings were placed in waterways, ore processing occurred on unlined ground surfaces, toxic chemicals were often not rinsed from ore prior to ore disposal, and no effort was made to reclaim exposed slopes. As a result, numerous old, mostly abandoned, mine sites are now severely impacting surface and ground waters in the Lahontan Region. Many surface waters in the Region, such as Monitor Creek, Leviathan Creek, Bodie Creek, and the Carson River, have moderate to high levels of heavy metals, salts, and/or mercury, due at least in part to past mining activities. High levels of metals have been detected in fish tissue under the State Board's Toxic Substances Monitoring Program. Surface and ground waters are also being impacted by acid mine drainage and severe erosion problems at mine sites.

***Case History—Leviathan Mine***

The Leviathan Mine, located in Alpine County, is the most significant abandoned mine site in the Lahontan Region. The soil and underlying geology of the site are sulfur-rich, and the mine has primarily been exploited for that mineral (although the earliest mining at the site was for metals). Operations at the site began in 1863, and continued under various owners until the late 1960s.

Until 1952, operations at the site involved tunnel mining, with minimal impact to nearby surface waters. In 1952, Anaconda Copper Company purchased the site and began an open-pit mining operation, dumping tailings directly into surface waters (Leviathan Creek). Acid mine drainage (AMD) then began leaching into surface waters in significant quantities.

After a fish kill occurred in 1959, Anaconda implemented some mitigation measures, but the impacts were difficult to control. In 1962, the Regional Board determined that the mine should be regulated, and requested a report of waste discharge from Anaconda. Anaconda responded by removing all the previously installed mitigation measures and selling the mine to Alpine Mining Enterprises, a small corporation with no assets.

The Regional Board adopted waste discharge requirements on Alpine Mining Enterprises in 1962

and spent the next several years trying unsuccessfully to make Alpine Mining Enterprises correct the AMD and erosion problems at the site. In 1969, the Regional Board referred the matter to the Attorney General, but litigation efforts were stymied by Alpine Mining Enterprises' lack of resources and the apparent lack of recourse against Anaconda under California law.

In 1978, California voters approved a bond measure which enacted the State Assistance Program (SAP), and the State Board granted the Regional Board $3.76 million from this bond act to address the Leviathan Mine problem, which was now causing occasional cattle kills and which had left an eight mile stretch of Leviathan and Bryant Creeks sterile. At about the same time, the Regional Board successfully negotiated with ARCO, the now parent company of Anaconda, for a $2.337 million settlement in lieu of litigation. As part of the settlement, the State of California purchased the mine for $50,000. The State Board was given the responsibility of overseeing restoration activities at the mine. The State Board assigned much of the oversight responsibility to the Regional Board.

In 1985, a restoration project was completed and the mine site was revegetated. The reclamation strategy was designed (by Brown and Caldwell Consulting Engineers) to control or eliminate approximately 75 percent of the AMD pollution previously entering Leviathan Creek. However, the plant species selected for revegetation were not tolerant to site conditions, and most of the plants have since died. This has left acres of eroding slopes which are currently inundating the mine's pollution abatement facilities with sediment, jeopardizing their function. Earth is also eroding from beneath the mine's pollution abatement facilities, undermining their structural stability. Additionally, the road system at the site has little drainage control and is contributing to the erosion and sedimentation problem. The eroding slopes and resulting contaminated sediment loads also endanger the restoration of the potential beneficial uses of the Leviathan Creek system.

Water quality monitoring data (for parameters including nickel, aluminum, iron, arsenic, sulfate, total dissolved solids, and pH) indicates a significant decrease in pollutant concentrations since the project was constructed. However, downstream beneficial uses have not been fully restored, pollutant loading is still significant, and all monitoring has been conducted during drought years when production of AMD is expected to be at a minimum.

On June 9, 1989, the USEPA issued its final decision on Section 304(*l*) of the Clean Water Act. As a result of this decision, Leviathan Creek was identified on the Section 304(*l*)(1)(B) “short list” as a waterbody impaired by toxic pollutants, specifically arsenic and nickel. Concurrently, the Leviathan Mine was listed under Section 304(*l*)(1)(C) as the point source contributing toxics to Leviathan Creek. In addition, the State of California submitted Aspen, Bryant and Leviathan Creeks for inclusion on the 304(*l*)(1)(A) “long list” as waterbodies not meeting State water quality standards.

The Section 304(*l*) listing required the State of California to prepare an Individual Control Strategy (ICS) for the Leviathan Mine by February 4, 1990. USEPA and the Lahontan Regional Board discussed a coordinated effort on the ICS during a workshop in January, 1991. No further actions have been taken by the State or Regional Board to pursue the ICS since that time.

## *Control Measures for Mining and Mineral Processing*

1. The Regional Board shall review all new mining, mineral processing, and exploratory operations (and existing unpermitted operations on a case-by-case basis) and issue conditional waivers, waste discharge requirements, or NPDES permits for operations that may (individually or cumulatively) result in potentially significant impacts to water quality or beneficial uses.

2. To control general water quality threats posed by mining and mineral processing operations, Best Management Practices (BMPs) shall be required, including mechanical or vegetative soil stabilization, runoff collection/treatment systems, vehicle fluid containment facilities, etc. Process water, aggregate washwater, and/or dust control water should be contained in ponds or behind dikes, or otherwise treated to remove sediments. (See BMP and stormwater control discussions in Section 4.3 and in the introduction to this Chapter).

3. Specific control measures include the following:

- **Gravel and Sand Operations:** The Executive Officer may issue a conditional waiver to any site where all operations and washwaters are confined to land, no discharge to surface waters, including wetlands, will occur, and stockpiles are protected from flooding. If disturbance is proposed in a wetland, Clean Water Act Section 401/404 Water Quality Certification must be obtained.

- **Leaching Operations:** The Regional Board shall regulate all discharges of cyanide or other toxic chemicals used in precious metal extraction, regardless of the size of the operation. Toxic chemicals should be prevented from escaping any portion of the leaching cycle. Pregnant and barren solution impoundments and leach pads should be lined and monitored; leaching vats and chemical storage facilities should have additional containment (e.g., an outer tank) and monitoring. If toxic chemicals are identified in underlying soils or ground water, the leaching process should be stopped until the leak can be located and repaired, and the contamination remediated.

- **Hard Rock Mining:** When new mining operations are proposed, the discharger must comprehensively test waste materials for acid generation potential. Waste which has a high acid generation potential must be placed in engineered containment or otherwise disposed of to either prevent AMD formation or to contain any AMD which is generated. The potential for leaching of soluble metals and salts should also be evaluated prior to commencement of operation at a new mine site. Mine wastes which will generate significant quantities of metals or salts should be disposed of to engineered containment or otherwise prevented from contaminating surface or ground waters.

## *Recommended Future Actions for Mining and Mineral Processing*

1. Pursuant to 304(*l*) regulations, the State Board must consider funding various remediation alternatives for the Leviathan Mine. The Regional Board shall consider the following alternatives and recommend some or all of them to the State Board for consideration:

   - **Control eroding slopes and mine tailings.** Implement a comprehensive slope stabilization and revegetation program specifically designed to establish plants that are tolerant to acidic soil and low water conditions, such as those which occur at the mine site. The established plants and structural improvements should stabilize the soils and significantly reduce erosion and sediment transport to pollution abatement facilities as well as the Leviathan Creek system. An established vegetative cover will also reduce stormwater percolation and the resultant generation of AMD.

   - **Control roadside drainage and erosion.** Regrade roads for proper drainage and install drainage control and treatment structures. By properly directing the concentrated runoff from roads and installing drainage structures, the integrity of the roads will be maintained while erosion and sediment transport to streams will be reduced.

   - **Control excess AMD.** Construct projects to reduce the pollution loading to area surface waters, construct an additional holding pond to contain AMD overflow from the existing evaporation ponds, and/or establish a wastewater treatment system to treat AMD overflows from the existing evaporation ponds to Leviathan Creek.

   - **Reline the ponds**

   - **Examine water diversion to prevent AMD formation**

2. In order to maintain the beneficial effects of the pollution mitigation project at Leviathan Mine, a number of regular maintenance activities must be conducted. These include: (1) periodic fence repairs, (2) annual sediment removal from drainageways, (3) flow regulation to and between ponds, (4) emergency repairs, and (5) periodic water quality monitoring to ensure that pollution

levels are not increasing. Over the long-term, major efforts will be required to either rehabilitate the existing project or to otherwise reduce the level of pollutants leaving the site.

3. The Regional Board should investigate the water quality impacts of other inactive mines and identify and implement appropriate control actions.

4. The Regional Board should consult with the California Department of Fish and Game to develop leaching operations control measures to protect wildlife from lethal chemicals. Such control measures could include covering or otherwise containing all waters with chemical concentrations at levels lethal to wildlife.

## Industrial Activities other than Mining and Mineral Processing

**Cement production.** There are currently several large cement production facilities located in the southern part of the Lahontan Region. These facilities quarry mineral products, crush and blend them proportionally, heat them together in a kiln, and then crush finely the resulting klinker product to form cement. The cement manufacturing process can result in degradation of both surface and ground water quality due to parameters and constituents including pH, chloride, sulfate, potassium, sodium, calcium, and metals such as chromium.

Two significant waste types are generated during cement production. The first, kiln dust, is off-specification product that is unable to meet the cement industry's alkalinity requirements because of the type of raw minerals mined at some plants. (Not all cement plants produce kiln dust.) Kiln dust is frequently dumped onsite near the plants and spread.

The pH of kiln dust is usually very high, ranging from 11 to 13.5 pH units. Due to its corrosive pH, kiln dust can be classified as a “hazardous” waste (under Title 23, Chapter 15, Cal. Code of Regs.). However, if a particular manufacturer has been granted a variance from the California Department of Toxic Substances Control, the Regional Board may find that their kiln dust could be classified as a “designated” waste (under Title 23, Chapter 15, Cal. Code of Regs.) or a “special” waste (under Title 22, Cal. Code of Regs.). The USEPA is currently studying this issue to determine how kiln dust should be classified.

The second type of waste, kiln refractory liner brick, is used to line the kilns and historically contained leachable amounts of chromium in concentrations considered hazardous. Often, when kiln brick containing chromium was replaced, it was disposed onsite. Recently, the kiln brick composition has been reformulated and new brick is now available that does not contain chromium. Currently, when kiln bricks are replaced, most cement plants will crush and recycle the old bricks through the cement manufacturing process.

**Concrete production.** There are numerous concrete batch plants throughout the Region. Concrete batch plants combine gravel, water, and cement to form concrete. Liquid and semi-solid waste from truck and equipment washout is produced. This waste is very alkaline (the pH may be as high as 12.5 in fresh cement), is high in TDS, and may contain assorted heavy metals. The washout may contain various additives or other chemicals that are used in concrete production. This wastewater is usually disposed to a settling pond, and then to a sewer (POTW) or to onsite percolation ponds. Waste concrete, left over from individual projects, is often disposed onsite by dumping in a large pile, where it hardens

**Asphalt production.** Asphalt batch plants generally involve mixing petroleum products (usually diesel fuel) with earthen materials. Large quantities of both materials are generally stored onsite. Water quality can be significantly degraded if these materials reach water courses.

**Lumber mills.** Lumber mills generally consist of outdoor log and lumber storage, indoor milling facilities, energy cogeneration facilities, and waste piles/ponds. Threats to water quality include wastewater from log watering (high in tannins, lignins, color, BOD, etc.), process wastewater from energy cogeneration (high in TDS, plus any chemical additives), ash from energy cogeneration (highly alkaline, possibly high in metals), and spillage of wood treatment chemicals (such as cupric arsenate, pentachlorophenol, etc.).

### *Control Measures for Industrial Activities other than Mining and Mineral Processing*

1. Industrial operations in the Lahontan Region shall be reviewed on a case-by-case basis, and regulated as appropriate. Conditional waivers, waste discharge requirements, or NPDES permits shall be issued as necessary to protect water quality and beneficial uses.

2. To control general water quality threats posed by erosion and stormwater from industrial operations, Best Management Practices (BMPs) shall be used, including mechanical or vegetative soil stabilization, runoff collection/treatment systems, vehicle fluid containment facilities, etc. (See BMP and stormwater control discussions in Section 4.3 and in the introduction to this Chapter). If industrial wastewater is being discharged to a wastewater treatment plant, pretreatment of the wastewater may be required (refer to Pretreatment Policy, discussed in Section 4.4, "Wastewater").

3. The Regional Board should continue to review Notices of Intent (NOIs) for statewide Industrial Stormwater NPDES permits, and should issue individual permits when needed to protect water quality.

Specific control measures applicable to industrial operations are as follows:

4. **Cement Industry:** The Regional Board shall regulate cement kiln dust disposal and all ready mix cement plants where water quality could be impacted. Wastewater from cement batch plants is considered to be a designated waste, and may need to be discharged to a lined impoundment, if site-specific characteristics (e.g., soil type, depth to ground water, ground water quality, etc) will not protect ground water from degradation. The Regional Board will consider, on a case-by-case basis, the need to line cement wastewater ponds. Solid or semi-solid wastes should be deposited in landfills or other legal points of disposal unless the discharger can demonstrate that the waste will not pose a threat to water quality if deposited onsite.

5. **Asphalt Batch Plants:** Waste control measures are fairly straightforward at such sites. Petroleum products should be stored in tanks, and the tanks placed in lined holding areas. If spillage to soil occurs, contaminated soils should be scraped up, stored on a liner, and incorporated into asphalt as soon as possible. A berm (or other runoff control) should be placed downgradient from earthen material stockpiles.

6. **Lumber mills:** Waste control measures include lined ponds for untreated wastewater, containment of surface runoff, and proper storage and disposal of ash (ash is usually landfilled, but may also be used as a soil amendment).

### *Recommended Future Actions for Industrial Activities*

1. The Regional Board should consider developing a policy for addressing the disposal of "off-specification" concrete. Possible policy might include requiring that the material be stored on a liner or stored indoors, or that ground water monitoring be conducted around the on-site spreading areas.

2. The Regional Board should consider developing a policy or policies for addressing the large, potentially toxic pits left at mining operations. Possible policies might include (but are not limited to) requiring that the pits be filled at the end of a site's operation, requiring long-term financial assurance to correct future water quality problems resulting from the pits, or lining the pits.

## Energy Production

There are several facilities in the Lahontan Region that produce electricity or provide energy for heating purposes. These facilities utilize sources including geothermal fluids, solar energy, fossil fuels, biomass, and hydroelectric power. Facilities producing energy from these sources all generate some type of waste products which can impact water quality if not properly treated, contained or disposed. (The disposal of wastes to land is discussed separately in "Wastewater and Solid Waste" and the "Ground Water Protection" sections of this Chapter).

Potential adverse impacts to water quality may result from the following waste stream components: spent geothermal fluids, cooling tower blowdown, boiler blowdown, ash, and supply water treatment system wastewater. Constituents which can impact water quality include: total dissolved solids (TDS), sediment, heavy metals, solvents, biocides, and residual chlorine. The temperature of discharged water can also affect receiving waters. Additionally, with hydroelectric projects, there may be flow depletions in the affected reach of the river or stream, resulting in impacts to water quality and beneficial uses.

***Geothermal***

Geothermal resources in the Lahontan Region have been explored and developed in the Surprise Valley, the Honey Lake Valley, Bridgeport Valley, Long Valley near Mammoth Lakes, and the Coso Known Geothermal Resource Area northwest of Ridgecrest. Exploration is currently underway at Fort Irwin. Geothermal resources found in the Region provide many opportunities for alternative energy development. Geothermal power plants extract hot water through large wells drilled from 500-10,000 feet below the surface. The hot water is either passed through heat exchangers (binary process) to create steam to generate electricity, or is used directly for space heating or in a heat exchange process to heat water for domestic and/or commercial uses. Hot water return flows from these processes are usually injected back into the geothermal reservoirs through separate wells, but in some cases are discharged to surface waters or to land. Geothermal steam and condensate may be highly mineralized and corrosive, and special precautions must be taken to ensure that geothermal development will not create pollution problems. Besides spent geothermal fluids, other wastes discharged from geothermal exploratory and production projects are: cuttings from well drilling operations, and fluids from well testing. Until it can be shown that such activities can be conducted without risk of water quality degradation, the Regional Board will oppose further consideration of geothermal exploration or development in the Eagle Lake Basin, Lassen County (see Resolution 82-7 in Appendix B).

***Fossil fuels***

Fossil fuel energy production facilities in the Lahontan Region include coal-fired steam plants and a gas compressor station. Future development of fossil fuel powered steam plants could occur in the South Lahontan Basin to meet the increasing energy needs of Southern California. Southern California Edison Company operates a coal gasification facility and a coal-fired steam plant using coal fines or underflow from a traditional coal-fired steam plant in Nevada. Waste discharges result from the following components: cooling tower blowdown, boiler blowdown, sulfur recovery processes, slag (from coal gasification) or fly-ash (from coal-fired plants), and supply water treatment system wastewater. The primary concern with the wastewater is the high concentration of total dissolved solids that threaten the water quality of underlying aquifers. Because of the high concentrations of salts and the further concentration through evaporation, the liquids in the waste ponds are considered designated wastes under Chapter 15. Southern California Gas Company operates a gas compressor station that discharges cooling tower blowdown water. The water discharged is of better quality than a nearby well used for irrigation, so most of the wastewater is being reclaimed for irrigation; the remaining water is discharged to an unlined evaporation-percolation pond.

***Solar***

Solar energy stations use a heating transfer fluid (HTF) to transfer heat from solar energy to water, in order to create steam for generating electricity. Waste stream components include: cooling tower blowdown, sodium regeneration water, demineralization blowdown, solar boiler blowdown, supply water treatment system wastewater, and power block runoff. Biocides are used in the cooling towers to prevent biological growth; the resulting waste products are acids and amines. Blowdown water contains sulfuric salts, due to the use of sulfuric acid to minimize scale buildup in condensers. The wastewaters are similar to those described for fossil fuel facilities and are considered designated wastes under Chapter 15. The HTF is not considered a waste, since it is used for production and is recirculated in a closed system. However, HTF spills do occur and the contaminated soil is classified as a waste. Such contaminated soil must be removed and properly treated and/or stored prior to disposal at an appropriate facility.

***Biomass***

Several energy production facilities exist in the Region that utilize biomass as a fuel source. Biomass fuels are typically the products or by-products of

logging or milling operations, however, household, medical, or other wastes may also be proposed for incineration. The primary water quality concern is the disposal of ash produced by such facilities. Such ash is often hazardous due to high pH and/or metals content. Ash generated by energy production facilities must be tested to determine its degree of hazard and disposed of in compliance with Chapter 15.

***Hydroelectric Power***

Hydroelectric power, or hydropower, is the power generated by conversion of the energy of running water. Hydroelectric facilities are usually constructed in or immediately adjacent to the water body being utilized. Water may be diverted from the water body, run through the facility, and returned to the river at some point downstream. Alternately, the flow of the entire river may be utilized. Impacts to a water body from hydroelectric projects include erosion and sedimentation resulting from construction, increased turbidity and temperature, and possibly discharge from turbines in the watercourse. Additionally, there may be flow depletions in the affected portion of the stream and loss of habitat and reduction in the recreational/aesthetic quality of the stream, resulting in impairment of the beneficial uses.

## *Control Measures for Energy Production*

1. The Regional Board regulates energy production facilities through the adoption of waste discharge requirements (WDRs) which specify effluent limitations, receiving water limitations, and other provisions in accordance with all applicable laws, regulations, and policies. The WDRs can also prohibit certain discharges, such as PCBs or waste discharges to surface waters or land. Spill control and prevention plans and closure plans, including assurance of financial responsibility, are required. Self-monitoring programs are issued along with the WDRs. The Regional Board may consider issuing a waiver of waste discharge requirements for interim discharges or where discharges are appropriately controlled by another permitting authority.

2. When adopting or amending WDRs for energy facilities, the Regional Board shall implement the following measures wherever appropriate:

   - Where interim waste discharges (such as drilling cuttings and test waters) are proven to be non-hazardous and no impacts to water quality will occur, discharges may be allowed to unlined sumps. Wastes left after evaporation may be buried on site. Such discharges would likely not require regulation by the Regional Board.

   - Where discharges may impact water quality or the waste is considered hazardous, wastes shall be discharged to lined ponds. Closure will require a synthetic liner for capping, or removal of cuttings to an appropriate disposal location. Such discharges would likely require waste discharge requirements or other regulation by the Regional Board.

   - Wastewaters from energy production facilities may be used for dust control during construction and operation where no adverse impacts to surface water or ground water quality will occur and where the wastewater is not hazardous.

   - Waste discharges from energy production facilities may be allowed to land (irrigation) or to unlined ponds where the effluent quality is similar to or of better quality than the receiving waters. Monitoring will be required to ensure that adverse impacts to the water quality of the receiving waters (either the underlying ground water or the nearby surface waters) will not occur.

3. For all proposed **geothermal operations**, the Regional Board encourages re-injection of spent geothermal fluids to an aquifer with similar water quality as the best measure to protect surface waters and good quality ground waters. If re-injection is not possible, the Regional Board will require all other proposed methods of disposal of spent geothermal fluids to result in a discharge which complies with all provisions of this Basin Plan.

   The Regional Board will coordinate with other permitting authorities to determine whether WDRs are appropriate. Where adequate water quality

protection can be provided by another permitting authority, the Regional Board may choose not to issue a waste discharge permit. The California Division of Oil and Gas (CDOG), which has jurisdiction and responsibility for geothermal development, supervises all well drilling and abandonment activities on private lands. CDOG also implements the Underground Injection Control Program, including the reinjection of geothermal fluids on private lands. The Regional Board works closely with the CDOG to regulate these facilities in accordance with the Memorandum of Agreement (MOA) between the State Board and CDOG as amended by State Board Resolution No. 88-61. The U.S. Bureau of Land Management and the U.S. Environmental Protection Agency have responsibility for regulation of reinjection on federal lands.

4. For proposed **hydroelectric projects**, the Regional Board will coordinate permitting processes with the Federal Energy Regulatory Commission (FERC) and the State Board. All hydroelectric projects which will produce energy for sale must comply with the FERC licensing process, or acquire an exemption from FERC. The FERC licensing process includes an optional preliminary permit, giving the permitted developer "first-in-line" status for a given project, while feasibility and environmental impact studies are performed for the project. After review of the feasibility studies, FERC may deny the license, grant it without conditions, or reserve continuing jurisdiction. Projects with capacity of 5 MW or less may be exempt from any FERC licensing requirements if the proposed facility is located at an existing dam, or will use an existing natural water feature. FERC also exempts projects producing 100 KW or less. (Note that hydro projects exempt from FERC may still require State water rights permits and/or waste discharge permits). All FERC licenses have expiration dates. Applicants for relicensing must complete the pre-filing requirements two years prior to the expiration of the current license. Before FERC will issue a license, applicants must provide evidence of compliance with State water rights laws.

   Section 401 of the Clean Water Act requires that applicants for a federal license or permit, such as a FERC license, for any activity which may result in a discharge to navigable waters, obtain a water quality certification from the State. The federal agency cannot issue the permit or license unless the State issues or waives 401 certification, and any conditions of the State's certification must be included as conditions of the federal permit or license. If the State denies the request, the federal permit or license cannot be issued. If the State fails to act on the request for certification within a mandated timeframe, the request is deemed waived. The State Board is the California agency designated to issue Section 401 certifications for hydroelectric projects. The certification process, as related to hydropower projects, is described below.

   *Water Rights Permit.* An applicant for development of hydropower must either possess a valid water right or else apply for one to the State Board. Generally, the State Board requires that the feasibility studies be nearly completed in order to show that the applicant has demonstrated diligence in acquiring a water rights permit. The State Board will also only issue one water rights permit per site. In the case of competing water rights applications, the State Board will wait until the FERC permit is granted.

   Protests regarding water rights applications must be filed with the State Board within the 45 or 60-day review period indicated in the notice of application for water rights. If the protestants and applicant cannot resolve their differences directly, the State Board will resolve the issue during an evidentiary hearing.

   *California Environmental Quality Act (CEQA).* Action cannot be taken by the State Board on a request for water quality certification for a hydroelectric project (Section 401 Certification) until compliance with CEQA is demonstrated. Whether or not a water rights permit is required for the project, the State Board will ordinarily be the lead agency for CEQA purposes. Until the State Board adopts an appropriate CEQA document or determines that the proposed project is exempt, no action will be taken on water quality certification. If the project proponent is a local agency, that agency should be the lead agency under CEQA. Again, no action on water quality certification will be taken until the local agency

adopts an appropriate CEQA document.

*Section 401 Water Quality Certification.* When a complete application and request for water quality certification has been received by the Regional Board, the Board immediately forwards the application and certification request to the State Board. The State Board 401 coordinator and the Regional Board coordinate to make a certification decision (certification issued, issued with conditions, or denied) within the mandated timeframe. The Regional Board may adopt waste discharge requirements in addition to Section 401 Water Quality Certification for hydroelectric projects. However, the WDRs may be preempted by FERC license provisions.

As a result of January 1, 1993 legislation, the State and Regional Boards have limited authority over hydroelectric projects. Their authority includes:

- Full authority over projects which are exempt from FERC licensing (the Los Angeles Department of Water and Power's Owens River Gorge facility is exempt).
- For multi-purpose projects, the State and Regional Boards may apply its requirements to the use of the project for irrigation, municipal use, or similar purposes.
- The State may still apply its water right requirements to the extent necessary to protect proprietary rights.
- The State may apply authority assigned or delegated to it under other federal laws, including water quality certification authority under Section 401 of the Clean Water Act, as described above.

5. For **hydroelectric projects**, in addition to the control actions described in No. 1 and 2 above, the Regional Board will recommend, as appropriate, the following as conditions of waste discharge permits and/or as recommended conditions for Section 401 Water Quality Certification:
   - Temporary and permanent erosion and drainage control measures during project construction and operation, including ongoing sediment cleanout from diversion structures, and stabilization of all disturbed areas associated with the project (e.g., transmission lines, access roads)
   - Mitigation of effects from reduced flows on maintenance of water quality and instream beneficial uses (including impacts on riparian habitat).
6. For **cogeneration facilities**, boiler blowdown and other process waters high in Total Dissolved Solids or conditioning chemicals should be appropriately contained (either by a liner system or by natural geologic containment). Ground water monitoring should be conducted around process water disposal areas.

## *Recommended Future Actions for Energy Production*

In cooperation with other appropriate local, state, and federal agencies, and private landowners, the Regional Board should develop a monitoring program to detect water quality trends, identify problem areas, and determine any needed levels of action.